

Where:

P = absolute intake manifold pressure in bars.

IMT = intake manifold temperature in degrees Fahrenheit.

(ii) Engine coolant temperature (ECT) less than or equal to the temperature defined by the following relationship between ECT and absolute intake manifold pressure (IMP) for the corresponding IMP:

$$P = 0.0778 \times \text{ECT} - 9.8889 \quad \text{Equation (2)}$$

Where:

P = absolute intake manifold pressure in bars.

ECT = engine coolant temperature in degrees Fahrenheit.

(2) [Reserved]

(g) *NO_x and NMHC aftertreatment warm-up.* For engines equipped with one or more aftertreatment devices that reduce NO_x or NMHC emissions, the NTE NO_x and NMHC emission limits do not apply when the exhaust gas temperature is measured within 12 inches of the outlet of the aftertreatment device and is less than 250 °C. For multi-bed systems, it is the temperature at the outlet of the device with the maximum flow rate that determines whether the NTE limits apply.

[65 FR 59961, Oct. 6, 2000, as amended at 66 FR 5188, Jan. 18, 2001; 70 FR 40441, July 13, 2005]

§ 86.1372-2007 Measuring smoke emissions within the NTE zone.

This section contains the measurement techniques to be used for determining compliance with the filter smoke limit or opacity limits in § 86.007-11(b)(1)(iv).

(a) For steady-state or transient smoke testing using full-flow opacimeters, equipment meeting the requirements of subpart I of this part or ISO/DIS-11614 “Reciprocating internal combustion compression-ignition engines—Apparatus for measurement of the opacity and for determination of the light absorption coefficient of exhaust gas” is required. This document is incorporated by reference (see § 86.1).

(1) All full-flow opacimeter measurements shall be reported as the equivalent percent opacity for a five inch effective

optical path length using the Beer-Lambert relationship.

(2) Zero and full-scale (100 percent opacity) span shall be adjusted prior to testing.

(3) Post test zero and full scale span checks shall be performed. For valid tests, zero and span drift between the pre-test and post-test checks shall be less than two percent of full-scale.

(4) Opacimeter calibration and linearity checks shall be performed using manufacturer’s recommendations or good engineering practice.

(b) For steady-state testing using a filter-type smokemeter, equipment meeting the requirements of ISO/FDIS-10054 “Internal combustion compression-ignition engines—Measurement apparatus for smoke from engines operating under steady-state conditions—Filter-type smokemeter” is recommended. Other equipment may be used provided it is approved in advance by the Administrator.

(1) All filter-type smokemeter results shall be reported as a filter smoke number (FSN) that is similar to the Bosch smoke number (BSN) scale.

(2) Filter-type smokemeters shall be calibrated every 90 days using manufacturer’s recommended practices or good engineering practice.

(c) For steady-state testing using a partial-flow opacimeter, equipment meeting the requirements of ISO-8178-3 and ISO/DIS-11614 is recommended. Other equipment may be used provided it is approved in advance by the Administrator.

(1) All partial-flow opacimeter measurements shall be reported as the equivalent percent opacity for a five inch effective optical path length using the Beer-Lambert relationship.

(2) Zero and full scale (100 percent opacity) span shall be adjusted prior to testing.

(3) Post-test zero and full scale span checks shall be performed. For valid tests, zero and span drift between the pre-test and post-test checks shall be less than two percent of full scale.

(4) Opacimeter calibration and linearity checks shall be performed using manufacturer’s recommendations or good engineering practice.

(d) Replicate smoke tests may be run to improve confidence in a single test

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or stabilization. If replicate tests are run, three additional tests which confirm to this section shall be run, and the final reported test results must be the average of all the valid tests.

(e) A minimum of thirty seconds sampling time shall be used for average transient smoke measurements. The opacity values used for this averaging must be collected at a minimum rate of 1 data point per second, and all data points used in the averaging must be equally spaced in time.

[65 FR 59962, Oct. 6, 2000]

§ 86.1375–2007 Equipment specifications for field testing.

For testing conducted with engines installed in vehicles, including field testing conducted to measure emissions under Not-To-Exceed test procedures, use the test procedures and equipment specified in 40 CFR part 1065, subpart J.

[70 FR 34619, June 14, 2005]

§ 86.1380–2004 Load response test.

(a) *General.* This section applies to 2004 through 2007 model year heavy-duty diesel engines. The purpose of this test procedure is to measure the brake-specific gaseous and particulate emissions from a heavy-duty diesel engine as it is suddenly loaded, with its fueling lever, at a given engine operating speed. The results of this test procedure are not compared to emission standards, and this test is not considered part of the Federal Test Procedure. This procedure shall be conducted on a dynamometer.

(b) *Test conditions and equipment.* All laboratory conditions, laboratory equipment, engine set-up procedures, test fuel, and testing conditions specified in this subpart for transient testing shall apply to the Load Response Test where applicable.

(c) *Test sequence.* (1) The test has 5 separate measurement segments, each identified by a specific engine speed. At each of the following speeds, beginning with the lowest torque point at that engine speed within the NTE control area for NMHC+NO_x, the engine fuel control shall be moved suddenly to the full fuel position and held at that point for four seconds, while the specified

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speed is maintained constant within the tolerances of the test facility. After the four second full fuel position, the load should be immediately brought back to the minimum NTE control area load for the specified engine speed for a period of 6 seconds. Prior to the beginning of each measurement segment, the engine shall be warmed up at the supplemental steady-state Mode 4 conditions (75% engine load, Speed B as specified in § 86.1360) until engine oil temperature has stabilized.

(i) Speed A as determined in § 86.1360(c);

(ii) Speed B as determined in § 86.1360(c);

(iii) Speed C as determined in § 86.1360(c);

(iv) Speed D as determined in § 86.1360(c);

(v) Speed E as determined in § 86.1360(c).

(2) The test sequence at each engine speed may be repeated, without pause between repeats, if it is necessary to obtain sufficient particulate matter sample amount for analysis.

(3) The exhaust emissions sample shall be analyzed using the applicable procedures under § 86.1340, and the exhaust emission shall be calculated using the applicable procedures under § 86.1342, for each measurement segment. Sampling rates for engine speed, engine load, and gaseous emissions shall performed a minimum rate of 10 Hz. Emissions for all regulated pollutants must be calculated and reported for each test speed condition in terms of g/bhp-hr.

(4) Data must be collected beginning with the start of the transition from the minimum NTE control area load to the full fuel position. Data must be collected until the end of the (final if repeated) 6 second operational period at the minimum NTE control area load described in paragraph (c)(1) of this section. Good engineering practice must be used to ensure that the sampling time is properly aligned with the engine operation.

[65 FR 59963, Oct. 6, 2000]